



GROUNDWATER
SERVICES, INC.

**WORKPLAN FOR SITE ASSESSMENT OF
PORTIONS OF A, B, AND C YARDS**

Southwest Shipyard
Channelview, Texas

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GSI Job No. G-2076
Revision No. 0
Issued: 10/27/97

October 27, 1997



TABLE OF CONTENTS

WORKPLAN FOR SITE ASSESSMENT OF PORTIONS OF A, B, AND C YARDS

Southwest Shipyard, Channelview, Texas

<u>SECTION</u>	<u>Page No.</u>
1.0 PROJECT SCOPE AND OBJECTIVES	1
2.0 SITE DESCRIPTION AND HISTORY	1
2.1 Site Location	1
2.2 Operational History	2
2.3 Site Hydrogeology	2
2.4 Description of Areas of Concern	2
3.0 SITE INVESTIGATION ACTIVITIES	7
3.1 Soil Investigation: Dry Dock Rail Area (A Yard)	7
3.2 Soil Investigation: Sheet Metal Dock Area (B Yard)	7
3.3 Soil Investigation: Background Metals	7
4.0 DATA EVALUATION	8
5.0 IMPLEMENTATION SCHEDULE	8
TABLES	
FIGURES	



October 27, 1997

WORKPLAN FOR SITE ASSESSMENT OF PORTIONS OF A, B, AND C YARDS

Southwest Shipyard
Channelview, Texas

1.0 PROJECT SCOPE AND OBJECTIVES

To confirm that remedial measures completed to date have adequately addressed primary and secondary sources of release, a site assessment will be completed at the Southwest Shipyard in Channelview, Texas (see Figure 1). Remedial measures have been implemented by Southwest Shipyard in response to comments received from the Texas Natural Resources Commission (TNRCC) in December 1996 regarding the three parcels of land that comprise the Southwest Shipyard facility (i.e., A, B, and C Yards). This workplan addresses the four areas of concern noted by the TNRCC, as follows: i) the Dry Dock Rail Area, ii) the Roll-off Bin Storage Area, iii) the Sheet Metal Dock Area, and iv) the Barge Painting Area.

This workplan has been prepared per provision 2.i of Agreed Order Docket No. 97-0453-IHW-E issued on August 29, 1997, by the TNRCC for the Southwest Shipyard. The objective of this workplan will be to outline field, laboratory, and engineering tasks to confirm that remedial measures undertaken to date for the four areas of concern have been sufficient to remove potential primary and secondary sources of release per requirements of the Texas Risk Reduction Rules set forth in 30 TAC 335 Subchapter S. The technical basis and principal tasks of this work program are detailed below.

2.0 SITE DESCRIPTION AND HISTORY

2.1 Site Location

The Southwest Shipyard is located in Channelview Texas approximately 17 miles east of Houston on Interstate 10 in Harris county Texas (see Figure 1). Operations at Southwest Shipyard include cleaning and repair of barges used for transporting chemical and petroleum products. Since startup in the 1960s, the majority of activities have been conducted on a 24-acre site owned by Southwest Shipyard known as A Yard. In addition, Southwest Shipyard has leased nearby sites, known as B Yard and C Yard, to conduct barge repair and painting (see Figure 2).



October 27, 1997

2.2 Operational History

Over the life of the facility, fill material having a thickness of 5 to 20 ft has been added to the site. The ground surface elevation in the area now ranges from sea level to 17 feet above sea level. The sand, clay, and gravel fill also contains construction debris such as concrete and asphalt.

One area of fill is the closed 3.5 acre surface impoundment in A Yard (see Figure 2). From the mid-sixties to 1979 the impoundment was used for on-site storage of oils and wastewater removed during barge cleaning and servicing. The impoundment was emptied in 1979, backfilled with construction debris and waste paper, covered with a 1 to 2 ft thick layer of kiln dust, and capped with an approximate 2 to 4 ft thick layer of clay. A Baseline Risk Assessment has recently been completed as part of the Corrective Action Program currently being implemented to address potential releases from the former surface impoundment (GSI, 1997).

2.3 Site Hydrogeology

The fill material is underlain by a gray sand with occasional interbedded clay and silty clay that ranges in thickness from 25 to 38 ft over most of the facility. A reddish brown clay unit extends from a depth of approximately 45 feet to more than 120 feet below ground surface. Depth to groundwater at the site generally ranges from 5 to 10 feet below grade. In the vicinity of A Yard, the direction of groundwater flow in the upper transmissive zone is east toward the San Jacinto river at a gradient of 0.01 ft/ft. No water level data are available for B Yard, however, shallow groundwater beneath the western portion of the peninsula likely flows in a plant-west direction toward the Old San Jacinto River, resulting in a north-south trending groundwater divide along the central axis of the peninsula.

Current Southwest Shipyard management practices provide for the routing of non-affected stormwater runoff to permitted stormwater outfalls. All precipitation potentially contacting waste materials is collected and routed to the on-site Water Treatment Facility for treatment, if necessary, prior to discharge via NPDES Outfall 001.

2.4 Description of Areas of Concern

On December 9-10, 1996, representatives of the TNRCC conducted an inspection of the Southwest Shipyard facility. TNRCC comments and



October 27, 1997

response actions completed to date by Southwest Shipyard are summarized on Table 1. Additional details regarding each of the areas of concern identified by the TNRCC are provided below.

2.4.1 Dry Dock Rail Area (A Yard)

- *Location and Operating History:* The Dry Dock Rail Area is located at the north end of A Yard (see Figures 2 and 3). Prior to 1996, when the Dry Dock Rail began operation, the area was used for various shipyard activities such as cutting, welding, and fabrication. After being emptied and cleaned in another area of the Southwest Shipyard facility, barges to be painted or repaired are placed on rail-wheeled dollies and moved to a work site along the Dry Dock Rail. Consequently, wastes potentially generated at the site are limited spent blast sand, paint and rust chips, and paint overspray.
- *Results of Previous Sampling:* Analyses of spent blast sand performed for waste classification indicate TCLP leachate concentrations for all the RCRA metals below regulatory limits (see Tables 2 and 3). In addition, results also evidence low concentrations of total metals, ranging from below detection for cadmium and mercury, to 64 mg/kg for zinc (see Table 4).
- *Results of TNRCC Inspection:* Barges were being painted in the Dry Dock Rail area without the use of screens or other method of shielding. Paints containing the solvent MEK were allowed to overspray onto the ground.
- *Remedial Actions Completed to Date:* Southwest Shipyard has modified operating and waste handling procedures at the Dry Dock Rail Area to address concerns noted by the TNRCC during the December 1996 inspection. Spray gun nozzles are cleared by discharging into an appropriate receptacle, rather onto the ground or into the air. During painting, covers are placed on the ground and painting shrouds are used to control paint overspray. After renovation is complete, barges are moved off the rails and all spent blast sand and rust scale are removed from the ground for disposal or recycling.
- *Proposed Investigation:* Potential secondary sources of release via affected surface soils containing residual concentrations of site constituents will be evaluated by collection and analysis of surface soil samples. Additional details of the field investigation are provided in Section 3 of this workplan document.



October 27, 1997

2.4.2 Roll-off Bin Storage Area (A Yard)

- *Location and Operating History:* The Roll-off Bin Storage Area (also designated Waste Management Unit 012) is located in the southeast section of A Yard atop the former surface impoundment (see Figures 2 and 4). The Roll-off Bin Storage Area consists of a bermed concrete pad and sump. Roll-off bins stored on the pad may contain Tank 307 bottoms consisting of oily sludge and solids as well as other wastes derived from barge washing. Fluids collected on the pad and in the sump are transferred to the on-site waste treatment facility for treatment.
- *Results of Previous Sampling:* Representative analyses of oily waste and Tank 307 bottoms completed for waste characterization are presented in Tables 2 and 3. Most TCLP leachate concentrations for metals were below relevant detection limits and all were below applicable regulatory limits. The Tank 307 bottoms are classified as hazardous based on a TCLP concentration for benzene of 2.45 mg/L, which exceeds the regulatory limit of 0.500 mg/L.
- *Results of TNRCC Inspection:* A spill of oily material at the Roll-off Bin Storage Area was noted under a roll-off bin within the curbed concrete area. The roll-off bin contained oily sludge classified as a hazardous waste from knock-out Tank 307. Evidence of previous spills was also noted.
- *Remedial Actions Completed to Date:* The oily material was removed and fluids associated with the material were collected in the sump and treated at the on-site Wastewater Treatment Plant. To eliminate the possibility of leakage of fluids or solids to the pad, Southwest Shipyard has modified waste handling practices such that wastes classified as hazardous are retained in vacuum boxes rather than roll-off bins. Potential releases resulting from waste handling or other activities in the Roll-off Bin Storage Area will be contained within the bermed concrete area and sump.
- *Proposed Investigation:* All released materials were contained within the bermed concrete area of the Roll-off Bin Storage Area, therefore, no adjacent surface soils were affected by releases from this area of concern. Thus, remedial actions completed to date have been sufficient to remove all potential secondary sources of release, therefore, no additional actions are proposed for the Roll-off Bin Storage Area.



October 27, 1997

2.4.3 Sheet Metal Dock Area (B Yard)

- *Location and Operating History:* The Sheet Metal Dock area is located in B Yard on the eastern bank of the Old San Jacinto River (see Figures 2 and 5). During the period of 1985 to the present, Southwest Shipyard has leased this portion of B Yard for barge sandblasting and painting operations. Currently, the site is owned by Mr. Slim Musgrove. To create the Sheet Metal Dock, two barges were run aground parallel to the bank of the Old San Jacinto River. A sheet metal platform was installed on the decks of the grounded barges to provide a staging area for barge painting and sandblasting. Barges to be serviced remain in the water tied up against the sheet metal dock. An approximate 100-ft wide strip of land adjacent to the sheet metal dock has been used by Southwest Shipyard to sandblast new pieces of metal used for barge repair and to stockpile spent blast sand.
- *Results of Previous Sampling:* Wastes potentially generated by the barge painting activity at B Yard include spent blast sand, paint and rust chips, and paint drip and overspray. No previous soil or groundwater investigations have been performed in the area.
- *Results of TNRCC Inspection:* Southwest was sandblasting on barges in the Old San Jacinto River without the use of screens or other method of shielding. Spent blast sand, paint chips, and paints containing the solvent MEK were discharged directly into the water. A recent spill of fresh paint was noted on the concrete bank of the Old San Jacinto River, approximately ten feet from the water's edge.
- *Remedial Actions Completed to Date:* In response to TNRCC concerns, Southwest Shipyard has modified operating and waste handling procedures at B Yard. Spent blast sand is now placed in containers kept a minimum of 50 feet from the water line. Full containers are transferred to a storage area in A Yard prior to offsite disposal. Sand blasting of barges is performed with covers and a sand recovery unit that prevent spent blast sand from entering the river. The practice of sandblasting on shore has been discontinued.
- *Proposed Investigation:* Potential secondary sources of release via affected surface soils containing residual concentrations of site constituents will be evaluated by collection and analysis of surface soil samples. Additional details of the field investigation are provided in Section 3 of this workplan document.



October 27, 1997

2.4.4 Barge Painting Area (C Yard)

- *Location and Operating History:* The Barge Painting Area is located in C Yard on a peninsula projecting north into the San Jacinto River approximately 2,000 ft north of A and B Yards (see Figures 2 and 6). Southwest Shipyard conducted barge painting operations at C Yard during the period of October to December 1996. The property has been owned since 1976 by Mr. Roberts of Big Star Barge and Boat Company (Maxim, 1996b). The site is reportedly "built up" with hard rock, cement and brick from demolition of the Port of Houston. Barges under repair by Southwest Shipyard were sandblasted at another location prior to painting at C Yard. Recent observations of the site indicated that dredging operations are currently taking place at the former location of Southwest Shipyard activities and dredged materials are stockpiled on site (see Figure 7).
- *Results of Previous Sampling:* Wastes potentially generated by the activities at C Yard include i) residual spent blast sand, paint chips, and rust chips swept from barge decks prior to painting; and ii) paint drip and overspray. No previous soil or groundwater investigations have been performed in the area.
- *Results of TNRCC Inspection:* Barges were being spray painted in the San Jacinto River without the use of screens or other method of shielding. Paints containing the solvent MEK were allowed to overspray into the water. Small pieces of non-asbestos insulation being installed onto the top of a barge were discharged into the San Jacinto River.
- *Remedial Actions Completed to Date:* Southwest Shipyard ceased operations at C Yard on December 31, 1996. Southwest Shipyard operates in compliance with the Texas Water Code by prohibiting unauthorized discharges.
- *Proposed Investigation:* Dredging operations conducted by the owner of C Yard have disturbed and potentially removed any residual materials resulting from Southwest Shipyard operations. In addition, Southwest Shipyard has discontinued all activities at C Yard. Therefore, no additional action is proposed for the Barge Painting Area.



October 27, 1997

3.0 SITE INVESTIGATION ACTIVITIES

As discussed above, secondary sources of release of site constituents via affected surface soil will be evaluated at the Dry Dock Rail and Sheet Metal Dock areas. Samples of surface soils will be collected and analyzed to confirm that site constituent concentrations are below background values. Field and laboratory activities designed to address key information objectives are outlined below. A sequential task summary and associated sampling and testing specifications are provided on Table 5. The sample program, sample collection information, and analyte list are summarized on Tables 6, 7, and 8, respectively.

3.1 Soil Investigation: Dry Dock Rail Area (A Yard)

- *Objective:* Confirm that site constituent concentrations are below background levels.
- *Field and Laboratory Tasks:* Collect samples from the top 3 inches of soil at locations shown on Figure 3 (i.e., SS-DD-1 through SS-DD-10) and test for presence of organic constituents using Organic Vapor Analyzer (OVA) headspace analyses. Submit soil samples for laboratory analysis of volatile organic compounds (VOCs) and RCRA metals. Drum soil cuttings and analyze as needed to determine appropriate waste disposal method.

3.2 Soil Investigation: Sheet Metal Dock Area (B Yard)

- *Objective:* Confirm that site constituent concentrations are below background levels.
- *Field and Laboratory Tasks:* Collect samples from the top 3 inches of soil at locations shown on Figure 5 (i.e., SS-SM-1 through SS-SM-10) and test for presence of organic constituents using Organic Vapor Analyzer (OVA) headspace analyses. Submit soil samples for laboratory analysis of volatile organic compounds (VOCs) and RCRA metals. Drum soil cuttings and analyze as needed to determine appropriate waste disposal method.

3.3 Soil Investigation: Background Metals

- *Objective:* Determine concentrations of metals in soils unaffected by site activities.



October 27, 1997

- *Field and Laboratory Tasks:* Collect background samples from the top 3 inches of soil at locations shown on Figure 3 (i.e., SS-B-1 through SS-B-8). Submit soil samples for laboratory analysis of RCRA metals. Drum soil cuttings and analyze as needed to determine appropriate waste disposal method.

4.0 DATA EVALUATION

Upon completion of the field and laboratory tasks described above, a report will be prepared to document soil sampling procedures, analytical laboratory reports, and chain-of-custody records. The data collected in this investigation will be evaluated to address the information objectives identified in Section 3 of this workplan.

To confirm that remedial activities have been complete at the Dry Dock Rail and Sheet Metal Dock Areas, concentrations for naturally occurring soil constituents (i.e., metals) will be compared to representative background values. The upper 95% upper confidence interval (UCI) on the mean of background metals calculated per U.S. EPA (1992) or other appropriate statistical technique will be used to obtain representative background metals concentrations.

Concentrations of site-related constituents not expected to occur naturally, such as volatile organic compounds, will be directly compared to appropriate risk-based levels in accordance with guidelines of the Texas Risk Reduction Rules. If total concentrations of waste constituents exceed background or Risk Reduction Standard 2 limits, the Synthetic Precipitation Leaching Procedure (SPLP, SW-846 Method 1312, U.S. EPA, 1996) or other appropriate leaching test will be applied to select samples. These results will be compared to appropriate standards of the TNRCC Risk Reduction Rules.

5.0 IMPLEMENTATION SCHEDULE

Current plans call for completion of the work program described above within 120 days following TNRCC approval of this workplan. Field work will commence within 2 weeks of approval from the TNRCC of this workplan, subject to the consent of the property owners. If results of the field program indicate that additional remedial actions are necessary, the final report will include an evaluation of required supplemental work tasks and preliminary schedule for completion.

Workplan for Site Assessment of Portions of A, B, and C Yards
Southwest Shipyard, Channelview, Texas

TABLES

Table 1	Summary of Completed Remedial Actions and Proposed Site Investigations
Table 2	Results of Material Testing: TCLP Metals, Volatiles, and Semi-Volatiles
Table 3	Results of Material Testing: TPH, pH, Reactivity, and Flash Point
Table 4	Results of Material Testing: Metals
Table 5	Sequential Summary of Work Tasks and Related Specifications
Table 6	Soil Sampling and Testing Program
Table 7	Sample Container, Preservation, and Holding Time Requirements
Table 8	List of Analytes
Table 9	References

TABLE 1
SUMMARY OF COMPLETED REMEDIAL ACTIONS AND PROPOSED SITE INVESTIGATIONS

Workplan for Site Assessment of Portions of A, B, and C Yards
 Southwest Shipyard, Channelview, Texas

GENERAL AREA	AREA OF CONCERN	SUMMARY OF TNRCC COMMENT	SOUTHWEST SHIPYARD RESPONSE
A Yard	Dry Dock Rail Area	<ul style="list-style-type: none"> Barges were being painted on the facility's dry dock rails without the use of screens or other method of shielding. Paints containing the solvent MEK were allowed to overspray onto the ground. 	<ul style="list-style-type: none"> <i>Completed:</i> Terminated primary source of release by employing screens, shrouds, or other shielding to prevent materials, such as industrial coatings, from reaching the ground surface or water. <i>Proposed:</i> Evaluate secondary sources of release via affected surface soils. Collect surface soil samples from 10 borings and analyze for metals and volatile organics.
	Rolloff Bin Storage Area	<ul style="list-style-type: none"> A spill of oily material was noted under a roll-off bin located on a curbed concrete area designated WMA 012. The roll-off bin contained oily sludge classified as a hazardous waste from knock-out Tank 307. Evidence of previous spills was also noted. 	<ul style="list-style-type: none"> <i>Completed:</i> Terminated primary source of release by removing and disposing the oily material and solids. Addressed affected groundwater and soil area beneath this area as part of CAP for the former surface impoundment (GSI, 1997). <i>Proposed:</i> Continue to employ the curbed concrete area and sump and implement the use of vacuum boxes to prevent future releases.
B Yard	Sheet Metal Dock Area	<ul style="list-style-type: none"> Southwest was sandblasting on barges in the Old San Jacinto River without the use of screens or other method of shielding. Spent blast sand and paint chips were discharged directly into the water. Southwest was spray painting on barges in the Old San Jacinto River without the use of screens or other method of shielding. Paints containing the solvent MEK were oversprayed into the water. A recent spill of fresh paint was noted on the concrete bank of the Old San Jacinto River, approximately ten (10) feet from the water's edge. 	<ul style="list-style-type: none"> <i>Completed:</i> Terminated primary source of release by i) employing an enclosed blast device for the sandblasting of barge topsides, ii) removing and disposing residual materials in accordance with applicable regulations, and iii) implementing measures to prevent future releases. <i>Proposed:</i> Evaluate secondary sources of release via affected surface soils. Collect surface soil samples from 10 borings and analyze for metals and volatile organics.

Notes:

1. TNRCC comments issued (date) regarding inspections conducted 12/9-10/96.
2. General areas and specific locations shown on Figure 2.
3. CAP = Corrective Action Program per 30 TAC Subchapter S.
 MEK = Methyl ethyl ketone.

TABLE 1
 SUMMARY OF COMPLETED REMEDIAL ACTIONS AND PROPOSED SITE INVESTIGATIONS

Workplan for Site Assessment of Portions of A, B, and C Yards
 Southwest Shipyard, Channelview, Texas

GENERAL AREA	SPECIFIC LOCATION	TNRCC COMMENT	SOUTHWEST SHIPYARD RESPONSE
C Yard	Barge Painting Area	<ul style="list-style-type: none"> Barges were being sandblasted in the Old San Jacinto River without the use of screens or other method of shielding. During the blasting process, spent blast sand and paint were discharge directly into the water. Barges were being spray painted in the San Jacinto River without the use of screens or other method of shielding. Paints containing the solvent MEK were allowed to overspray into the water. Small pieces of non-asbestos insulation being installed onto the top of a barge were discharged into the San Jacinto River. 	<ul style="list-style-type: none"> <i>Completed:</i> Terminated primary source of release by ceasing operations at C Yard on 12/31/96. <i>Proposed:</i> No further actions are proposed.

Notes:

1. TNRCC comments issued (date) regarding inspections conducted 12/9-10/96.
2. General areas and specific locations shown on Figure 2.
3. CAP = Corrective Action Program per 30 TAC Subchapter S.
 MEK = Methyl ethyl ketone.

TABLE 2
 RESULTS OF MATERIAL TESTING:
 TCLP METALS, VOLATILES, AND SEMI-VOLATILES

Workplan for Site Assessment of Portions of A, B, and C Yards
 Southwest Shipyard, Channelview, Texas

SAMPLE I.D.: SAMPLING LOCATION: SAMPLING DATE: COMPOUND	Regulatory Limit	EPA Reference Method	Oily Waste Rolloff Bin Storage 3/4/97 mg/L	Tank Bottoms Rolloff Bin Storage 12/6/96 mg/L	Spent Sand Dry Dock Rail 3/6/97 mg/L
TCLP Metals					
Arsenic	5.00	SW-846 6010	<1.00	<0.05	<1.00
Barium	100	SW-846 6010	16.5	0.93	2.00
Cadmium	1.00	SW-846 6010	<1.00	<0.01	<0.01
Chromium	5.00	SW-846 6010	<1.0	<0.05	0.55
Lead	5.00	SW-846 6010	<1.00	<0.05	0.28
Mercury	0.20	SW-846 7470	<0.20	<0.005	<0.2
Selenium	1.00	SW-846 6010	<0.5	<0.1	<0.50
Silver	5.00	SW-846 6010	<1.00	<0.01	<0.20
Tin	NS	SW-846 6010	1.20	NA	0.175
TCLP Volatile Compounds					
Benzene	0.500	SW-846 8270	<0.100	2.450	<0.100
2-Butanone	200	SW-846 8270	<12.000	2.190	<12.000
Carbon Tetrachloride	0.500	SW-846 8270	<0.100	<0.050	<0.100
Chlorobenzene	100	SW-846 8270	<0.120	<0.050	<0.120
Chloroform	6.000	SW-846 8270	<1.000	<0.050	<1.000
1,1-Dichloroethene	0.700	SW-846 8270	<0.100	<0.050	<0.100
1,2-Dichloroethane	0.500	SW-846 8270	<0.100	<0.050	<0.100
Tetrachloroethene	0.700	SW-846 8270	<0.120	<0.050	<0.120
Trichloroethene	0.500	SW-846 8270	<0.100	<0.050	<0.100
Vinyl Chloride	0.200	SW-846 8270	<0.100	<0.100	<0.100
TCLP Semivolatile Compounds					
o-Cresol	200	SW-846 8270	<0.050	0.59	<0.050
m+p Cresol	200	SW-846 8270	<0.050	0.57	<0.050
1,4-Dichlorobenzene	7.500	SW-846 8270	<0.050	<0.050	<0.050
2,4-Dinitrotoluene	0.130	SW-846 8270	<0.050	<0.02	<0.050
Hexachlorobenzene	0.130	SW-846 8270	<0.050	<0.02	<0.050
Hexachlorobutadiene	0.500	SW-846 8270	<0.050	<0.02	<0.050
Hexachloroethane	3.000	SW-846 8270	<0.050	<0.02	<0.050
Nitrobenzene	2.000	SW-846 8270	<0.050	<0.02	<0.050
Pentachlorophenol	100	SW-846 8270	<0.250	<0.20	<0.250
Pyridine	5.000	SW-846 8270	<0.050	<0.02	<0.050
2,4,5-Trichlorophenol	400	SW-846 8270	<0.050	<0.02	<0.050
2,4,6-Trichlorophenol	2.000	SW-846 8270	<0.050	<0.02	<0.050

NOTES:

- Sample locations shown on Figure 2.
- Regulatory limits referenced from 40 CFR 261.29, Table 1.
- Oily Waste and Spent Sand analyzed by ACE Technologies, Inc., Houston, Texas.
 Tank bottoms analyzed by Mercury Environmental Service, Houston, Texas.
- < = Analyte not detected at limit indicated.
 NS = None specified.
 NA = Not analyzed.

TABLE 3
RESULTS OF MATERIAL TESTING:
TPH, pH, REACTIVITY and FLASH POINT

Workplan for Site Assessment of Portions of A, B, and C Yards
 Southwest Shipyard, Channelview, Texas

SAMPLE I.D.: SAMPLING LOCATION: SAMPLING DATE: ANALYTE	units	EPA Reference Method	Oily Waste Rolloff Bin Storage 3/4/97	Tank Bottoms Rolloff Bin Storage 12/6/96	Spent Sand Dry Dock Rail 3/6/97
TPH	mg/kg	418.1	62,890	NA	394
pH	std units	SW-846 9045	9.18	8.7	9.34
Reactive Cyanides	mg/kg	7.3.3.2	1.00	<0.25	<1.00
Reactive Sulfides	mg/kg	7.3.4.2	<10.0	1.53	<10.0
Flash Point	°F	SW-846 1010	>140	>150	>140

NOTES:

1. Sample locations shown on Figure 2.
2. Oily Waste and Spent Sand analyzed by ACE Technologies, Inc., Houston, Texas.
 Tank bottoms analyzed by Mercury Environmental Service, Houston, Texas.
3. < = Analyte not detected at limit indicated.
 TPH = Total petroleum hydrocarbons.

TABLE 4
RESULTS OF MATERIAL TESTING:
METALS

Workplan for Site Assessment of Portions of A, B, and C Yards
 Southwest Shipyard, Channelview, Texas

SAMPLE I.D.: SAMPLING LOCATION: SAMPLING DATE: COMPOUND	EPA Reference Method	Spent Sand Dry Dock Rail 3/6/97 mg/kg
Antimony	SW-846 6010	<0.10
Arsenic	SW-846 6010	<0.10
Barium	SW-846 6010	41.0
Beryllium	SW-846 6010	<0.20
Cadmium	SW-846 6010	<1.00
Chromium	SW-846 6010	11.0
Copper	SW-846 6010	9.80
Lead	SW-846 6010	0.56
Mercury	SW-846 7470	<0.0002
Nickel	SW-846 6010	5.90
Selenium	SW-846 6010	<0.50
Silver	SW-846 6010	<0.05
Vanadium	SW-846 6010	5.50
Tin	SW-846 6010	3.50
Zinc	SW-846 6010	64.0

NOTES:

1. Sample locations shown on Figure 2.
2. Spent sand analyzed by ACE Technologies, Inc., Houston, Texas.
3. < = Analyte not detected at limit indicated.

TABLE 5
SEQUENTIAL SUMMARY OF WORK TASKS
AND RELATED SPECIFICATIONS

Workplan for Site Assessment of Portions of Yards A, B, and C
Southwest Shipyard, Channelview, Texas

SITE INVESTIGATION ACTIVITY	TECHNICAL SPECIFICATIONS
1) Project Mobilization	
a) <i>Site Access:</i> Obtain access authorization from on-site and off-site property owners.	—
b) <i>Stake Locations:</i> Stake all surface sampling locations.	—
2) Collection of Verification Samples	
a) <i>Shallow Soil Sampling:</i> Collect surface soil samples (i.e., 0 to 3 in depth) for the Dry Dock Rail and Sheet Metal Dock areas at the locations shown on Figures 3 and 5. Conduct OVA headspace analyses on all samples.	<ul style="list-style-type: none"> • <i>Soil Analyses:</i> Submit soil sample from each soil sampling location for laboratory analysis of metals and VOC content. • <i>Waste Management:</i> Drum soil cuttings and analyze as needed to determine appropriate waste disposal method.
b) <i>Background Soil Sampling:</i> Collect surface soil samples (i.e., 0 to 3 in depth) at the locations shown on Figure 3.	
3) Engineering Surveys	
a) <i>Sample Locations:</i> Survey location and ground surface elevation of each soil sampling point.	<ul style="list-style-type: none"> • <i>Survey Specifications:</i> Measure locations to nearest 1 ft. Measure elevations to nearest 0.1 ft relative to known datum.
4) Laboratory Analyses	
a) <i>Soil Samples:</i> Analyze for metals and VOC content.	<ul style="list-style-type: none"> • <i>Laboratory Methods:</i> See Table 6 for laboratory program specifications.
d) <i>QA/QC Samples:</i> Prepare 1 field duplicate per every 10 samples and 1 matrix spike/matrix spike duplicate for every 20 samples for laboratory analysis.	

Notes:

1. Proposed soil sampling locations shown on Figures 3 and 5.
2. VOC = volatile organic compounds.

TABLE 6
SOIL SAMPLING AND TESTING PROGRAM

Workplan for Site Assessment of Portions of A, B, and C Yards
 Southwest Shipyard, Channelview, Texas

Area of Concern	Analytes	EPA Reference Method No.	Number of Environmental Samples	Number of QA Samples		Total Number of Samples
				Duplicates	Matrix Spike Duplicates	
<i>A Yard: Dry Dock Rail Area</i>	• Metals	SW-846 6010 or SW-846 7000 series	10	1	1	12
	• Volatile Organic Compounds	SW-846 8260	10	1	1	12
<i>B Yard: Sheet Metal Dock Area</i>	• Metals	SW-846 6010 or SW-846 7000 series	10	1	0	11
	• Volatile Organic Compounds	SW-846 8260	10	1	0	11
<i>Background Soils</i>	• Metals	SW-846 6010 or SW-846 7000 series	8	1	1	10

Notes:

1. Requirements for sample containers, preservation, and holding times are provided on Table 7.
2. A complete list of analytical parameters is provided on Table 8.
3. Analyses will be conducted in accordance with protocol specified in the EPA Reference Methods specified above (U.S. EPA, 1996).

TABLE 7
SAMPLE CONTAINER, PRESERVATION, AND HOLDING TIME REQUIREMENTS

Workplan for Site Assessment of Portions of A, B, and C Yards
 Southwest Shipyard, Channelview, Texas

Analytes	EPA Reference Method No.	Sample Container	Sample Storage	Maximum Holding Time	
				Extraction	Analysis
• Metals	SW-846 6010 or SW-846 7000 series	8 oz glass jar	4° C	NA	180 days
• Volatile Organic Compounds	SW-846 8260	4 oz glass jar	4° C	NA	14 days

Notes:

1. Soil sampling and testing program shown on Table 7.
2. A complete list of analytical parameters is provided on Table 8.
3. Analyses will be conducted in accordance with protocol specified in the EPA Reference Methods specified above (U.S. EPA, 1996).

TABLE 8
 LIST OF ANALYTES

Workplan for Site Assessment of Portions of A, B, and C Yards
 Southwest Shipyard, Channelview, Texas

Metals (SW-846 6010 or 7000 series)

Arsenic	Chromium	Selenium
Barium	Lead	Silver
Cadmium	Mercury	

Volatile Organic Compounds (SW-846 8260)

Acetone	1,2-Dibromo-3-chloropropane	2-Hexanone
Acrolein	1,2-Dibromoethane	Methylene chloride
Acrylonitrile	Dibromomethane	4-Methyl-2-Pentanone
Benzene	1,2-Dichlorobenzene	Styrene
Bromodichloromethane	1,3-Dichlorobenzene	1,1,1,2-Tetrachloroethane
Bromoform	1,4-Dichlorobenzene	1,1,2,2-Tetrachloroethane
Bromomethane	Dichlorodifluoromethane	Tetrachloroethene
2-Butanone	1,1-Dichloroethane	Toluene
Carbon Disulfide	1,2-Dichloroethane	1,1,1-Trichloroethane
Carbon Tetrachloride	1,1-Dichloroethene	1,1,2-Trichloroethane
Chlorobenzene	cis-1,2-dichloroethene	Trichloroethene
Chlorodibromomethane	trans-1,2-Dichloroethene	Trichlorofluoromethane
Chloroethane	1,2-Dichloropropane	1,2,3-Trichloropropane
2-Chloroethylvinylether	cis-1,3-Dichloropropene	Vinyl Acetate
Chloroform	trans-1,3-Dichloropropene	Vinyl chloride
Chloromethane	Ethylbenzene	Xylenes (total)

Notes:

1. All analyses to be completed in accordance with current edition of U.S. EPA, "Test Methods for Evaluating Solid Waste," SW-846, 1996.
2. Soil sampling program outlined on Table 6; and sample container, preservation, and holding time requirements provided on Table 7.

TABLE 9
REFERENCES

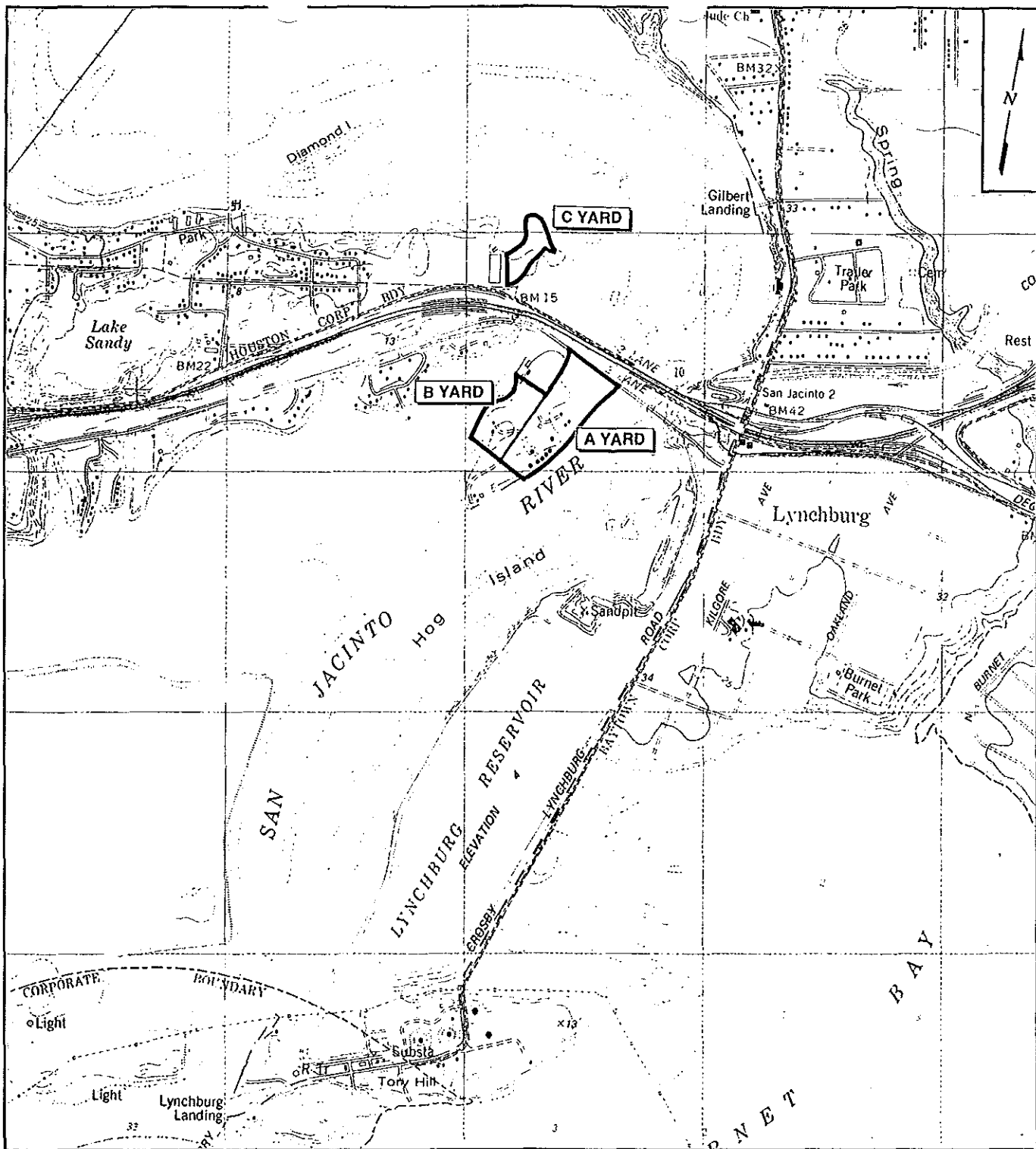
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Southwest Shipyard, Channelview, Texas

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Workplan for Site Assessment of Portions of A, B, and C Yards
Southwest Shipyard, Channelview, Texas

FIGURES

- Figure 1 Site Location Map
- Figure 2 Location of Areas of Concern
- Figure 3 Site Plan: Dry Dock Rail Area
- Figure 4 Site Plan: Roll-off Bin Storage Area
- Figure 5 Site Plan: Sheet Metal Dock Area
- Figure 6 Site Plan: Barge Painting Area
- Figure 7 Current Activities at Barge Painting Area



U.S. Geological Survey Map
 Highlands, Tex. (1982)
 Quadrangle: 7.5 minute

SCALE (ft.)
 0 1000 2000



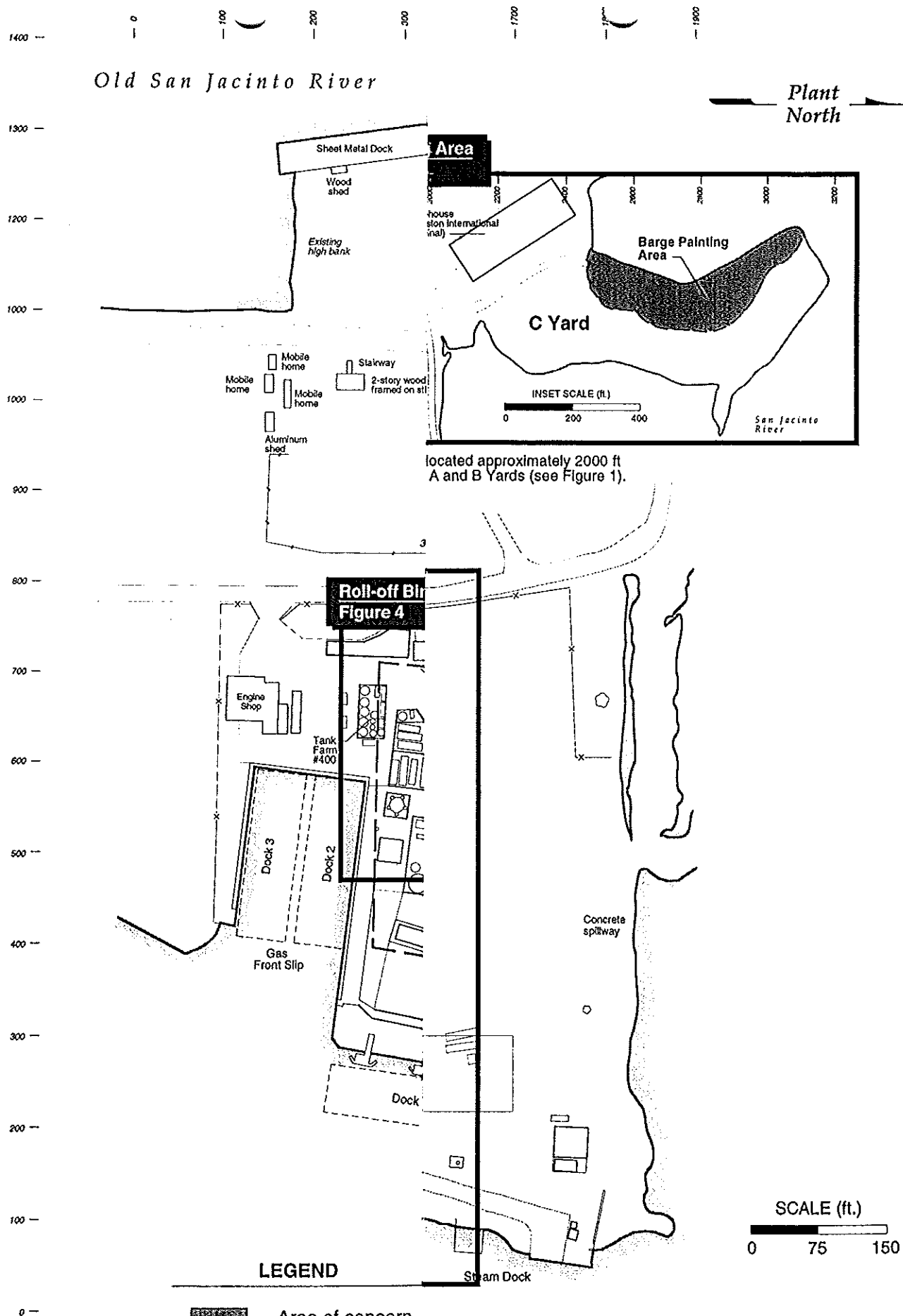
GROUNDWATER
 SERVICES, INC.

SITE LOCATION MAP

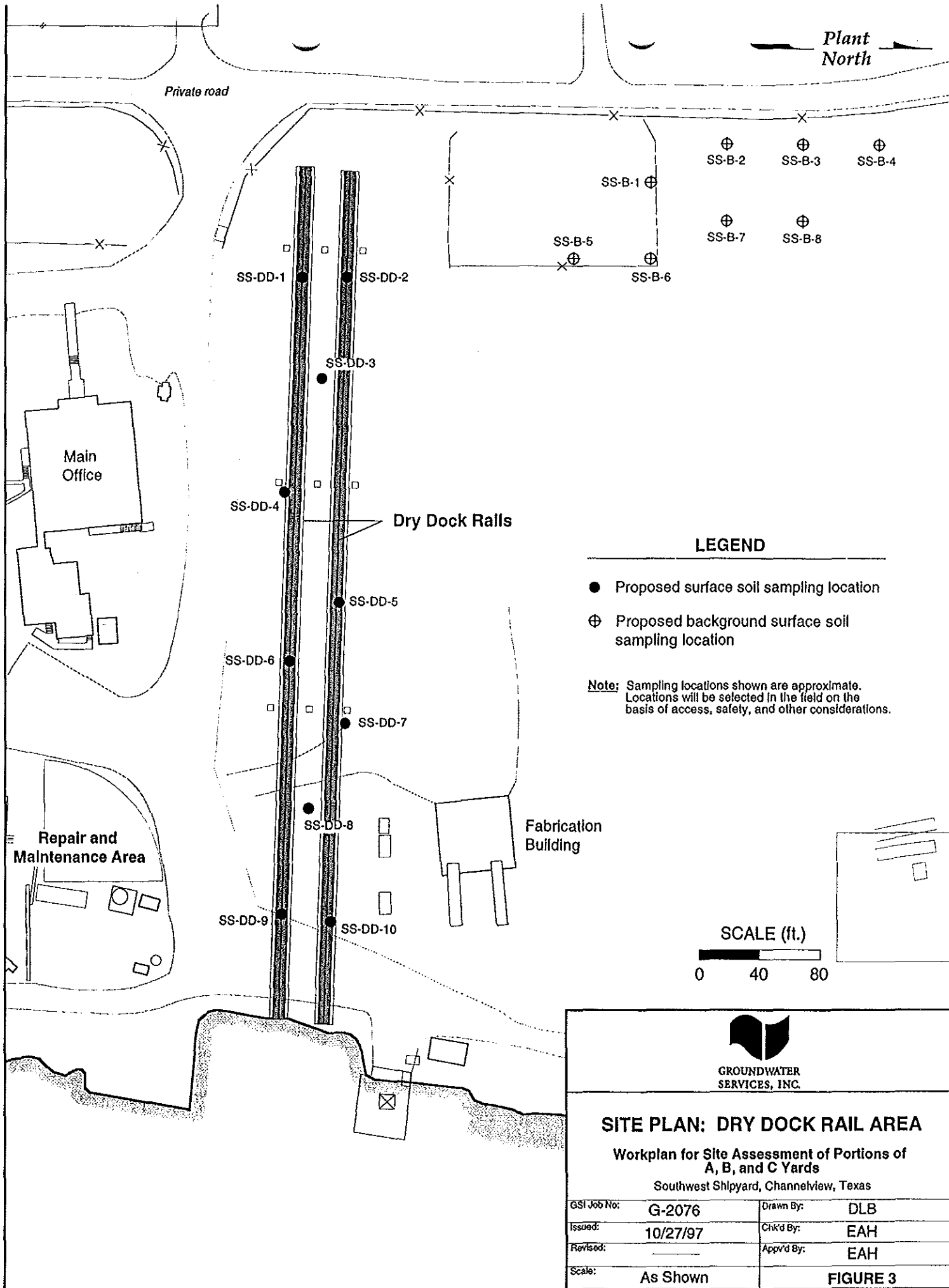
Southwest Shipyard, Channelview, Texas

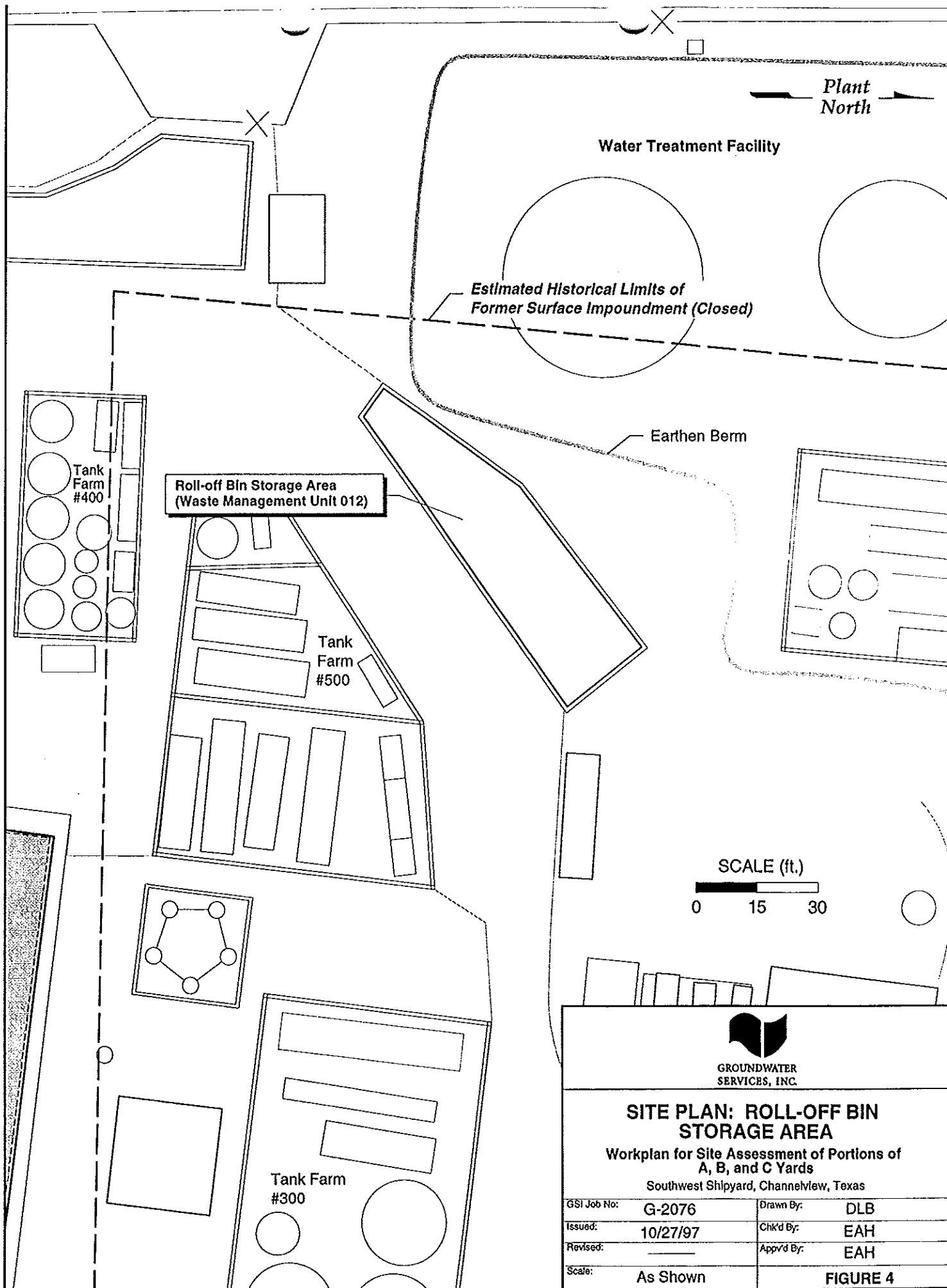
GSI Job No.:	G-2076	Scale:	As Shown
Drawn by:	DLB	Approved by:	EAH
Revised:	—	Date:	10/27/97

FIGURE
 1



LOCATION OF AREAS OF CONCERN
 Workplan for Site Assessment of Portions of A, B, and C Yards
 Southwest Shipyard, Channelview, Texas





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SITE PLAN: ROLL-OFF BIN STORAGE AREA

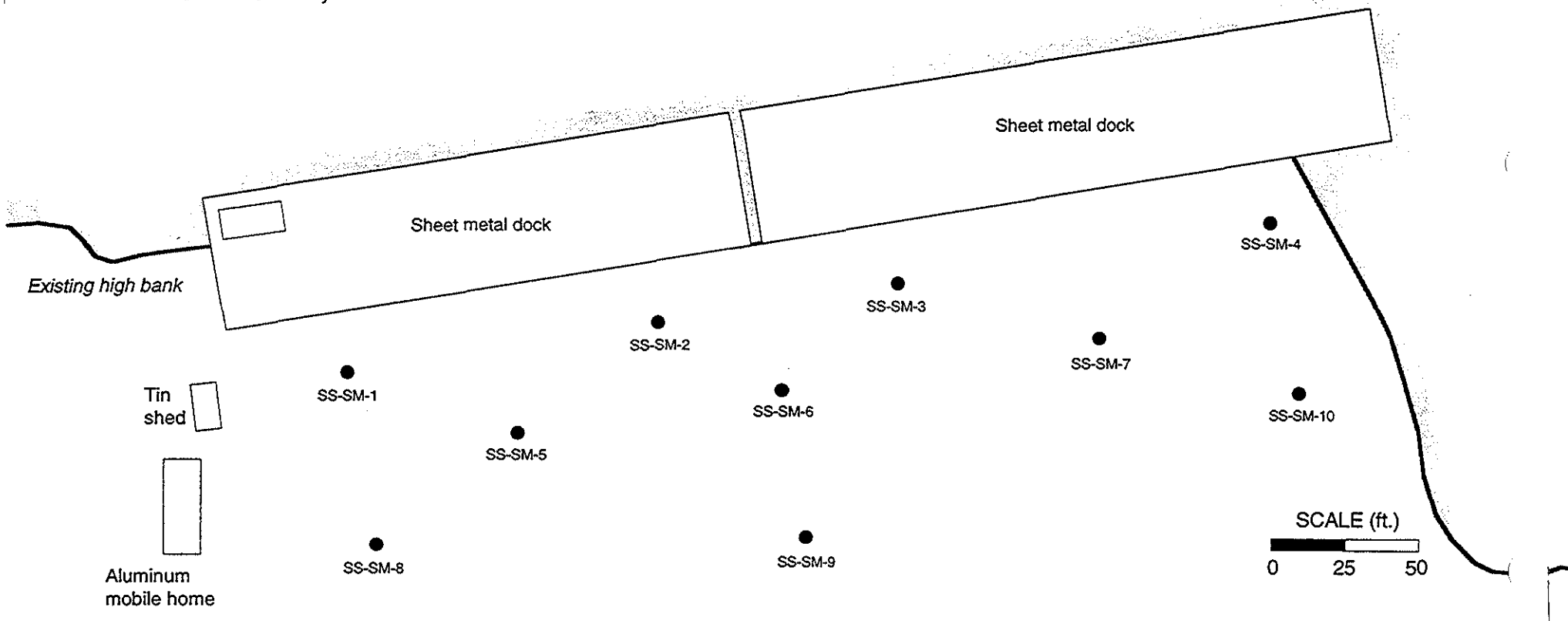
Workplan for Site Assessment of Portions of
A, B, and C Yards

Southwest Shipyard, Channelview, Texas

GSI Job No:	G-2076	Drawn By:	DLB
Issued:	10/27/97	Chk'd By:	EAH
Revised:		App'd By:	EAH
Scale:	As Shown	FIGURE 4	

Plant
North

Old San Jacinto River



LEGEND

- Proposed surface soil sampling location

Note: Sampling locations shown are approximate. Locations will be selected in the field on the basis of access, safety, and other considerations.

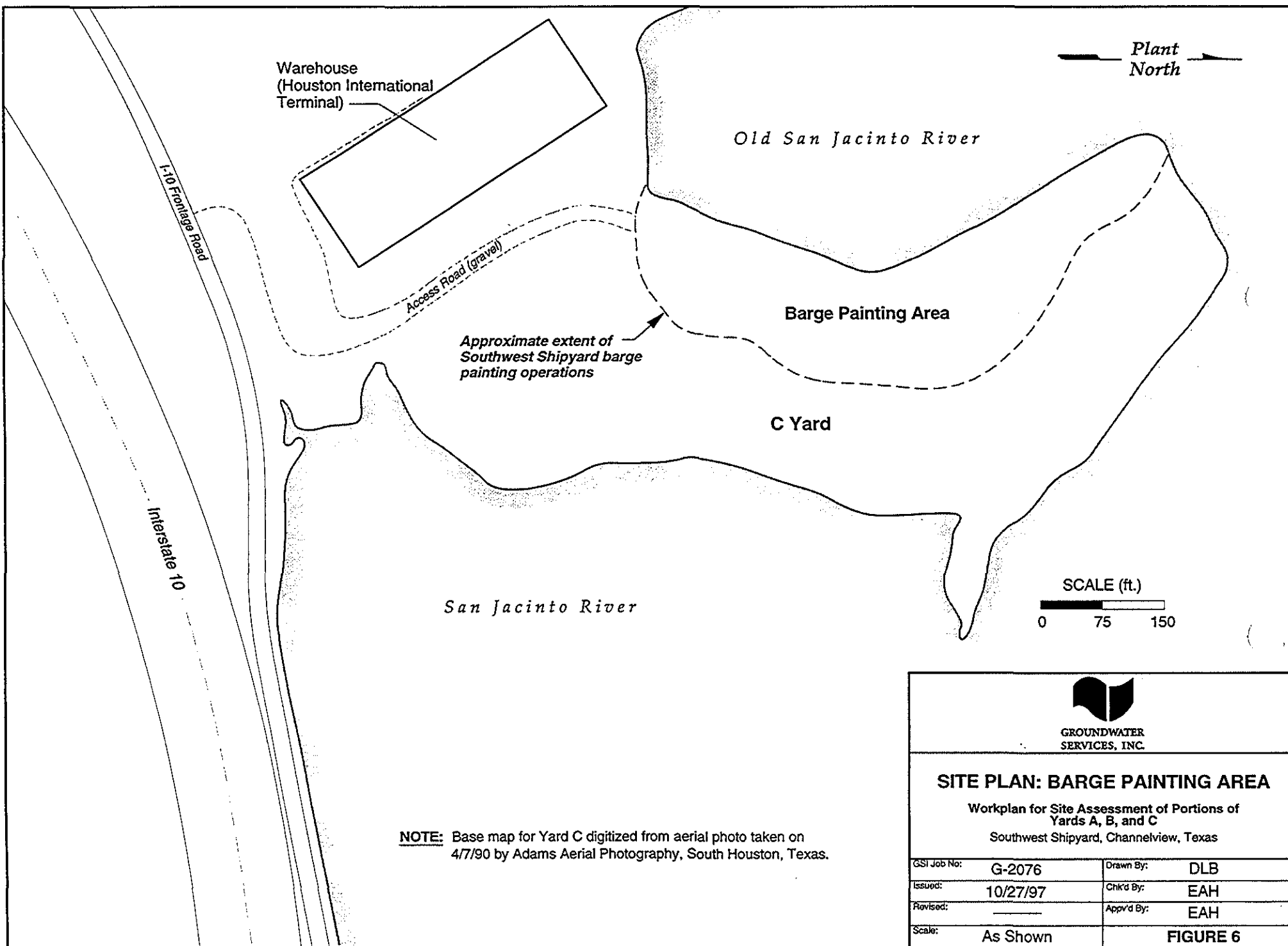


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SITE PLAN: SHEET METAL DOCK AREA

Workplan for Site Assessment of Portions of
A, B, and C Yards
Southwest Shipyard, Channelview, Texas

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**Current Dredging Operations at
Former Barge Painting Area on C Yard**
(photograph taken facing north on 10/14/97)



GROUNDWATER
SERVICES, INC.

CURRENT ACTIVITIES AT BARGE PAINTING AREA

Workplan for Site Assessment of Portions of
Yards A, B, and C
Southwest Shipyard, Channelview, Texas

GSI Job No:	G-2076	Drawn By:	DLB
Issued:	10/27/97	Chk'd By:	EAH
Revised:	—	Appv'd By:	EAH
Scale:	As Shown	FIGURE 7	